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In re Application of: Teodorovich, Mishko

Group Art Unit: 3635

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Examiner: Kwiecinski, Ryan

For: Door and window sill pan with drain

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Commissioner of Patents and Trademarks

P.O. Box 1450

Alexandria, VA 22313-1450

Central fax number 571-273-8300

Via EFS-FILE

**DECLARATION OF COMMERCIAL SUCCESS AND LONG-FELT NEED  
UNDER RULE 1.132**

Dear Examiner Kwiecinski:

My name is Mishko Teodorovich.

Background and Expertise

I am an engineer, with a degree Master of Science in Engineering, a home-builder and an expert on water intrusion. I am familiar with products and techniques for water intrusion prevention at doors and windows. I have testified as an expert witness in claims and litigations in building industry regarding water intrusion and related damages on residential and commercial buildings. I was an instructor at Texas Tech University, for a Residential Failure Analysis class, with focus on water intrusion, construction defect and best methods to avoid water intrusion problems. I have provided solutions for window and door installation for numerous customers in building industry. I am on the Fenestration Manufacturers Installation Committee.

The market need to prevent water intrusion and mold growth

Since the oil crisis in 1970s, the US has been faced with increasing need to reduce dependence on foreign oil by reducing energy consumption. Due to over 50% of oil consumption in US used to heat and/or air condition the buildings, increasing the energy efficiency of the buildings continues to be priority over the last 50 years, and we can expect this trend to continue to be a priority in the foreseeable future. In addition, building industry is increasing the use of more sustainable building materials such as recycled cellulose-based materials, like paper-backed drywall, MDF instead of natural wood, cellulose insulation, and other similar products. To summarize, during the last 50 years we have witnessed increased energy efficiency of buildings and increased used of recycled cellulose-based products, and we expect this trend to continue during the next 20 – 30 years. The implications of increased energy efficiency is that any moisture that accumulates in the wall cavity will take much longer to dry, and re-occurring moisture may not dry at all. Building materials that are made from recycled cellulose-based materials have much higher sensitivity to liquid moisture causing microbial growth then for the natural wood, or masonry materials. Microbial growth, i.e. toxic mold, in buildings can make buildings unsafe for human occupancy and therefore unacceptable.

#### Current best construction practices are based on zero tolerance for water intrusion

Buildings are more sensitive to water intrusion now than in the past, and we can expect that future building will be even more sensitive to water intrusion than current buildings. Methods and products used to protect buildings from water intrusion and related damages need to be more effective than in the past, more user-friendly, cost effective and durable. The building industry is looking for best practices and methods that are based on zero tolerance for water intrusion. Builders have long term liability for water intrusion and related damages and building industry is looking for effective and durable products which can be guaranteed for 10 years or more.

#### Doors and windows need sill pans

As witnessed by numerous claims and litigations, one of the most vulnerable areas for water intrusion is around windows and doors. Water accumulates at the bottom of

windows and doors, underneath window sill and door sill. If this water is not managed properly, it can create significant damage to the building, and in some cases the repair cost can exceed the value of the building.

#### Problems with prior art sill pans - lack of drainage, support, durability, and cost

The use of sill pan installed underneath a window or a door sill to evacuate this water is known from the past. The problem with existing sill pans is the lack of effective drainage, a lack of proper support for windows and doors, and a lack of durability to provide protection over 10+ years. Due to these issues the usage of a sill pan in the past was relatively small.

Due to much higher sensitivity of current buildings to water intrusion, a sill pan with more effective drainage is needed to effectively drain liquid moisture to the exterior. Introducing a drainage slope in the sill pan introduces a new need, which is to properly support the window or door, and to have the mentioned slope properly oriented, with unobstructed drainage path, and integrated with the rest of the building envelope. In order to have a commercial success, the sill pan must be easy to use and the cost must be as low as possible.

I invented the SureSill™ Sloped Sill Pan and related products to address these deficiencies and needs of the market.

#### Competitor- Jamsill

Prior to the introduction of the SureSill Sloped Sill Pan, the most successful sill pan was a non-sloped pan sold by Jamsill, Inc. According to the Jamsill website ([www.jamsill.com](http://www.jamsill.com)) the company has sold over a million pans in over 20 years. After the introduction of the SureSill Sloped Sill Pan, Jamsill began selling a sill pan with “sloped weep areas”.

#### Competitor – Wark sloped sill pan

The Wark sill pan has been available since 2003 or before. It is reported to be available in only one US location - in Seattle WA, with sales reported only for various projects in the northwestern US and neighboring areas in Canada. It has only three reported sizes that are used for vinyl windows.

The Wark sill pan does not have a “continuous support”, and is used for vinyl windows only- not doors or wood windows. The lack of continuous support can lead to twisting and warping of wood windows and door sills. In addition, a door sill typically takes the weight of persons stepping on the sill and various weights like wheelbarrows, dollies, and other means of transporting bulky items like furniture, pianos, etc. over the door sill. Door sills are designed for continuous support underneath. Without continuous support, damages are likely to occur on door sills or to have “wobbly” sills. The problem with high proximity of “*window supports*” which could make them close to a continuous support is increase in cost of both material and assembly expense of having additional supports. In addition to not having continuous structural support, this poses a problem or large open space underneath the window sill or underneath door sill prone to infestation of small animals, water infiltration due to wind driven rain, and energy loss due large open space. Windows and doors are not designed for this configuration.

By contrast, the current invention provides for continuous support ridges and occasional cuts for drainage.

#### Other patents cited

The cited Burk patent does not show drain channels in the front ridge for water to be drained to the exterior. The water would just accumulate, and corrode the metal. It can also leak through the seams as they are just folded metal. Burk patent is not practical for supporting door sills because it has only one front supporting ridge, which would not work for a door sill. I am not aware of any sill pan product based on the Burk design.

The cited Bazurk patent, the Headrick patent, and the Massey patent all describe door sills only, and not a sill pan.

### Suresill Sales and Market Share

SureSill was first available in April 2004, and it's currently available in all 50 states in USA in over 2,000 locations. We have sold over 400,000 individual units in 4 years since we had SureSill first available. SureSill is available through major multi-billion dollar suppliers of building materials such as Stock Building Supply, Hope Lumber, BMC West, Hutting, TM Cobb, 84 Lumber, and others. SureSill is also available through Home Depot, and other home improvement centers. SureSill is used for aluminum, vinyl, and wood windows, entry doors, patio doors, sliding doors, in both residential and commercial construction.

SureSill is the only sill pan in the "Exterior Door Installation Guidelines" by Stock Building Supply, a multi-billion dollar distributor of building materials with over 200 locations in US.

Although SureSill, Ltd. does not sell directly to builders but to distributors only, our distributors have reported that SureSill has been sold to major national home builders such as: Toll Brothers, D.R. Horton, Ryland, Pulte, Centex, and others.

I believe that SureSill currently has the largest market share for sill pans.

### Product Recognition (Reviews and Endorsements)

SureSill has been called "The Cadillac of Sill Pans" by Energy Design Magazine, while evaluating other sill pans on the market, April 2006.

SureSill Sloped Sill Pan is the only sill pan published in California Builder's Guide to Reducing Mold Risk, published by California Energy Commission, July 2004.

TLS Labs, the Independent Testing Lab: "The SureSill is high performance system that will be an asset to any builder serious of keeping water out of the homes he builds."

An additional best practice endorsement from a major building supplier is expected in April or May 2008.

SureSill Features and benefits as related to the claims

**Continuous support.** SureSill provides lateral support ridges during length of the entire rough opening while having occasional cuts in ridges for directional drainage. Windows and doors are designed to have continuous support underneath.

**Effective Draining Mechanism.** Due to longitudinal ridges that provide both strength and continuous support, SureSill is known as the “rigid sill pan” that is suitable for both doors and windows. Often, the surface underneath the door/window is not leveled, and in the case of concrete foundation the surface is often uneven and can have a backward slope. Because SureSill is a “rigid pan” we recommend installing the SureSill plumb and level by inserting the shims underneath SureSill, and then placing the door/window on the pan. Installing the pan leveled provides directional drainage to the exterior because the recessed slope is properly oriented. By contrast, other sill pans recommend having the rough opening “plumb and level” prior to sill pan installation which is frequently not done because it is unrealistic to expect that the rough opening will be re-framed or the foundation re-leveled prior to sill pan installation. This leads to other sill pans being installed on a slanted surface which causes the sill pan to hold the water rather than drain it to the exterior.

**Lower Cost of Product.** An extruded base without injected components is less expensive to manufacture than injected plastic. This makes SureSill less expensive while providing higher quality product.

**Lower Cost of tooling.** The cost of tooling (and time to produce it), for extrusion (extrusion die) is a fraction of the cost of tooling for injection molding (injection mold). This cost difference increases with length, and an injected sill pan base over 2 - 3 feet in length is too expensive and uncompetitive in comparison with extruded base of similar size and material thickness.

**Sill Pan Length.** The extruded base makes it possible to have long lengths like 12 feet or 16 feet without joints. Joints are weak points for possible leaks and require additional labor in order to seal them.

**Easy Installation.** Door/window rough opening come in many sizes between one foot and typically up to 12 feet and the exact size is often determined by the tradesman on the job site. SureSill extruded base is cut-to-fit.

**Reduced Inventory.** With lengths in 80 inches and 154 inches SureSill has minimal number of SKU which makes it very convenient for both distributors and end users. Other sill pans have 10 – 15 SKUs per size.

**Rigidity and strength.** Longitudinal ridges provide the rigidity which contributes to the overall quality and strength of the sill pan. This is particularly important for longer lengths. Additional longitudinal ridges can be easily added for more rigidity and strength if needed.

**Lock-in joints with end caps.** Extruded ridges that vary in width from top to bottom allow for engineered “lock-in” feature with end caps. End caps can slide in and out longitudinally while aligned with the base. Once assembled, and placed into rough opening, the end caps can not be misaligned or disassembled from the base unless the sill pan is removed from the rough opening and end caps are allowed to slide out longitudinally. This allows for a strong joint and proper alignment between the base and the end caps. This is very important in order to have a waterproof connection between the base and the caps. When installing other sill pans, such as Wark or Jamsill, end caps are just placed on top of the base and the adhesive is responsible to both to keep the alignment and to provide a waterproofing connection. This requires larger overlapping surfaces with end caps, which makes end caps larger and more expensive. The pressure of the door/window can easily misalign the caps from the base which would typically cause leaks. This has been reported to us by numerous customers and have made it

relatively easy for customers to accept SureSill. For other pans it is recommended to wait until the adhesive has completely bonded which can be up to couple hours or more. This adds to labor time. Because of the engineered joint SureSill end caps stay aligned with the base even if the adhesive did not bond, and adhesive can bond after the installation. SureSill does not require waiting and installation can proceed immediately. SureSill end cap have smaller overlapping surfaces with the base, which makes them less expensive to both manufacture and ship. This results in SureSill end caps being over 50% cheaper than Wark or Jamsill.

**Appealing finished look.** In most door applications the rear up-stand is visible. Homeowners have expectations of finished surfaces to look nice and to blend well with the rest of the finishes. Joints and splices do not look appealing. SureSill end caps have 1” or less overlap with the base and the joint is hidden behind the door/window casing. When installation is complete, SureSill provides a single clean edge without visible seams.

**Faster Installation of Doors/Windows.** Leveling a sill pan first reduces labor for door/window installation and number of installers needed, because it is much easier faster to level SureSill than a heavy door or window. Other sill pans recommend installing the sill pan on the surface and then placing shims inside the pan to level door/window. This is both time consuming and less practical comparing to SureSill. If the pan is not leveled or its slope properly oriented, it can actually hold the water instead of draining the water. This standing water can be absorbed by the door/window sill and frame causing mold and decay, and can also find its way to the wall cavity and damage the building. In addition, placing leveling shims inside the sill pan is very difficult when door/window has nailing flanges. A combination of the rear up-stand leg on the sill pan and the nailing flange on the front of the sill pan makes it practically impossible to slide shims in-and-out without removing the door/window first. This means that for any adjustment door/window needs to be removed and then placed back in the rough opening. This makes leveling arduous and time consuming. Shims for adjusting SureSill can easily slide in and out underneath SureSill from the back side and the pan can be leveled before placement of the



door/window. Placing door/window on the plumb and level pan makes the door/window plumb and level.

**Warranty.** Due to strength and durability provided by extruded base and lock-in end caps, SureSill has 10 Year labor and material warranty. Other sill pans including Wark have up to 3 year warranty, with product replacement only, while some sill pans have no warranty or have a disclaimer that explicitly says there is no warranty.

### Claims

The independent claims of the current invention are listed below with emphasis added. The extruded lengthwise front and rear sill supports of the current invention provide the key rigidity, economy of manufacture, and continuous support discussed in the product features. The ability to cut the extruded base to a desired length and attach the first and second end pieces provides the ability to precisely fit the sill pan assembly to an actual door or window opening.

The sloped sill pan has enough rigidity so that the sill pan can be shimmed as necessary to be installed plumb and level, which allows for proper orientation of the slope and provides effective drainage. In addition, the current invention allows for high quality but low cost manufacturing and relatively low cost of a sloped sill pan to the end user. High durability of the current invention allows for long warranty as needed by the building industry.

### Claim 1

The product has all of the elements of claim 1. One aspect of the product is the lengthwise supports. This orientation of supports provides the needed strength for door support and permits the product to be extruded. Extrusion permits the products to be manufactured and sold at a lower price than competing products. The extrusion also permits longer sections to be purchased and easily cut to a desired length. This feature further reduces cost by lowering the number of separate stock items and provides additional versatility to the builder.

1. (Previously presented) A sill pan for a window or door comprising
  - a sill pan base having a length and a width, the sill pan base comprising
    - a first end,
    - a second end
    - a sloped upper portion,**
    - a rear wall,
    - a front flange,
    - a rear sill support, and
    - a front sill support
  - such that the rear sill support and the front sill support on the sill pan base are lengthwise in order to permit the sill pan base to be manufactured by extrusion** without requiring subsequent addition of support elements;
  - a **first end piece** comprising
    - a end piece base having a top surface, a bottom surface, a first side edge, a second side edge, a rear edge, and a front edge, such that the end piece base is attachable to the sill pan base in the proximity of the first end of the sill pan base and the first side edge of the end piece base,
    - a side upward lip projecting from the top surface of the end piece base along the second side edge, the side upward lip extending from the front edge to the rear edge of the end piece base, and
    - a downwardly extending front lip projecting from the top surface of the end piece base along the front edge, the downwardly extending front lip extending from the first side edge to the second side edge of the end piece base; and
  - a **second end piece** comprising
    - a end piece base having a top surface, a bottom surface, a first side edge, a second side edge, a rear edge, and a front edge, such that the end piece base is attachable to the sill pan base in the proximity of the first end of the sill pan base and the first side edge of the end piece base,
    - a side upward lip projecting from the top surface of the end piece base along the second side edge, the side upward lip extending from the front edge to the rear edge of the end piece base, and
    - a downwardly extending front lip projecting from the top surface of the end piece base along the front edge, the downwardly extending front lip extending from the first side edge to the second side edge of the end piece base.

#### Claim 10

The product is manufactured and installed according to the method described in claim 10:

10. (Previously presented) A method of manufacturing a sill pan comprising  
 extruding a first sill pan base unit, the sill pan base unit comprising  
 a first end  
 a second end  
 a slanted upper portion,  
 a rear wall,  
 a downwardly extending front flange,  
 a rear sill support, and  
 a front sill support

**such that the rear support and the front support on the first sill pan base unit are lengthwise in order to permit the first base unit to be manufactured by extrusion;**

cutting the first sill pan base unit to a desired length;  
 affixing a first end element to the first end of the sill pan base unit; and  
 affixing a second end element to the second end of the sill pan base unit.

#### Claim 18

The product has all of the elements of claim 18:

18. (Previously presented) A sill pan for a window or door comprising of an extrudable sill pan base having a length and a width, the sill pan base comprising

a first end,  
 a second end,  
 a sloped upper portion,  
 a rear wall,  
 a rear sill support, and

**a front sill support, such that the rear sill support and the front sill support are oriented lengthwise on the sill pan base;**

**a first end piece**, attachable to the sill pan base in the proximity of the first end of the sill pan base, the first end piece comprising

a horizontal tab which may be inserted between the rear support and the front support, the horizontal tab having a top surface aligned with the top surfaces of the rear support and the front support,  
 a recess for receiving and overlapping the first end of the rear wall,  
 a recess for receiving the first end of the rear sill support, and  
 a recess for receiving the first end of the front sill support; and

**a second end piece**, attachable to the sill pan base in the proximity of the second end of the sill pan base, the first end piece comprising

a horizontal tab which may be inserted between the rear support and the front support, the horizontal tab having a top surface aligned with the top surfaces of the rear support and the front support,  
 a recess for receiving and overlapping the second end of the rear wall,  
 a recess for receiving the second end of the rear sill support,  
 a recess for receiving the second end of the front sill support.

Conclusion

The Suresill sloped sill pan, built and installed according to the claims of the current invention, is commercially successful and is addressing a long-felt need in the building industry for cost-effective and reliable solutions to preventing water intrusion and associated mold damage to structures.

I, Mishko Teodorovich further state that the above statements were made with the knowledge that willful false statements and the like are punishable by fine and/or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that any such willful statement may jeopardize the validity of this application or any patent resulting therefrom.

Date: April 22, 2008.

  
Mishko Teodorovich